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EXAMINER

ODLAND, DAVID E

ART UNIT	PAPER NUMBER
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2662

DATE MAILED: 04/29/2004

12

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/621,031

Applicant(s)

GURA ET AL.

Examiner

David Odland

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-15, 17-35, 37-49 and 51-60 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-15, 17-35, 37-49 and 51-60 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The following is a response to the amendments filed on 02/13/2004.

Information Disclosure Statement

2. The information disclosure statement filed on 09/12/2000 (paper number 4) fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. Specifically, the IDS contains 5 pages. The references cited on page 4 of the 5 pages have been received and considered. However, the references cited on pages 1-3 and 5 have not been received. Note these references from pages 1-3 and 5 are crossed out and the references on page 4 have been considered as shown on the copy of the IDS that is accompanying this Office Action.

Claim Rejections - 35 USC § 112

3. Claims 2-15, 17-35, 37-49 and 51-60 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2, 12, 17, recite a "...method for operating a distributed arbiter..." in the preamble. It is unclear how the steps recited in the claim are 'operating' the distributed arbiter (i.e. there is no correlation made between the steps recited in the claims and how those steps are implemented by the arbiter). Note, from the applicants specification and figure 18B it appears as though the

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each arbiter of the distributed arbiter receives the request instead of the resources receiving the requests, as recited in the claims. Furthermore, it appears as though the arbiter is what is granting the resource based on the priority. Finally, it appears as though the request priority indication supplied by the requesters to the arbiter so it can make the arbitration decisions and not supplied to the resource, which is recited in the claim. These corresponding corrections should be made and as such these corrections will clarify how the distributed arbiter is operated and thus clarify the claim. Note, it is requested that the Applicant carefully review each claim so that they properly recite which functions are being performed by the arbiter and which are being performed by the requesters and resources in accordance with the above problems, since there are numerous claims with such errors. For example, claims 6, 8 and 15 also should also be corrected accordingly.

Claims 2,12,17,35,40 and 56 recite that the respective requester priorities are inversely related to a number of requests made by the requester. It is unclear whether the number of requests is for a single resource or for the number of requests made by each of the requesters for different resources. It appears for the specification on pages 6 and 7 that the number of requests made by each requester is the number of requests for different ones of the plurality of resources and not the number of requests for the same resource. Thus it appears as though the claim should recite that the priorities are inversely related to a number of requests made 'to different ones of the plurality of resources', which would clarify the claim in accordance with the description given in the specification.

Claim 56 recites "... one of the resources..." in line 4 and "...the one resource..." in lines 6 and 10. There is a lack of antecedent basis for these limitations of the claim. Note, it

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appears that the preamble of the claim should recite that the arbitration mechanism is allocating 'one of a plurality of resources' rather than just 'a resource' and for clarity the other limitations of the claim should be consistent with the preamble by reciting 'the one of the plurality of resources' instead of 'the one resource' and 'at least the one resource'.

Claim 58 recites that the first instruction is for receiving 'an indication of the grants' and the second instruction is for accepting 'one of the grants'. These limitations are confusing. The first instruction does not allow the arbiter to receive the actual grant but rather it receives 'an indication' of the grant. Therefore, how can the second instruction accept the actual grant itself. It appears as though the claim should recite that the first instruction receives the grants and not just the 'indication' of the grants.

Claim 58 also recites that the priority used by arbitration mechanism is inversely related to a number of requests 'received by a resource'. This limitation is confusing. The specification discloses that the arbiter receives the requests and grants access to the requesters based on the priority. Thus the requests are not actually received by the resources.

Lastly, claim 58 recites that the grants are given priority (i.e. grant priorities). This limitation is confusing. The specification discloses that grants are made based on resource priorities but does not disclose giving priority to the grants themselves, thus it is unclear how grants are given priority.

Claims 3-11, 13-15, 18-34, 37-39, 41-49, 51-55, 57, 59 and 60 are rejected because they depend on rejected claims.

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4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 2-4,6-11,25-32 and 34, as best understood, are rejected under 35 U.S.C. 102(e) as being anticipated by Calvignac et al. (USPN 6,370,148), hereafter referred to as Calvignac.

Referring to claim 2, Calvignac discloses a method comprising receiving at one of the resources, requests for the one resource from a plurality of requesters (the arbiter receives requests from the input adapters who are requesting the output adapters of the crossbar switch (see items 110,120 and A,B,C and in figure 1)), and granting the one resource to one of the requesters according to respective requester priorities, the respective requester priorities being inversely related to a number of requests made respectively, by the requesters (the arbiter grants the output adapter requested by the input adapter who has the least number of requests (see column 6 lines 20-35 and figures 1,3 and 5)) and the requesters supplying respective requester priority indications to at least the one resource (the input adapters send requests to the arbiter thus they are providing requester priority indications (see figures 1,3 and 5)). Note, the terms ‘requester priority information’ can be interpreted broadly to mean any signal send by the input adapters that indicates information used to determine priority. Thus, the number of requests send by the input adapters for the different output adapters is used by the arbiter to determine the input adapter priority and thus the number of requests can be considered ‘requester priority indications’.

Referring to claim 3, Calvignac discloses the system discussed above. Furthermore, Calvignac discloses that the requesters respectively supply number of requests as requester priority indications (the input adapters send requests to the arbiter thus they are providing requester priority indications (see

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figures 1,3 and 5)). Note, the terms 'requester priority information' can be interpreted broadly to mean any signal send by the input adapters that indicates information used to determine priority. Thus, the number of requests send by the input adapters for the different output adapters is used by the arbiter to determine the input adapter priority and thus the number of requests can be considered 'requester priority indications'.

Referring to claims 4, Calvignac discloses the system discussed above. Furthermore Calvignac discloses granting at least one of the plurality of resources to a requester according to a round robin scheme, thereby avoiding starvation (a double round robin approach is used to form the request and fairness matrices that are used to arbitrate input to output and prevent starvation by making sure all connections are ultimately made (see column 5 lines 31-67 and column 6 lines 55-60)).

Referring to claims 6, Calvignac discloses the system discussed above. Furthermore Calvignac discloses that the multiple resources evaluate received requests sequentially (the requests are input to the arbiters matrices sequentially (see the matrices in figure 3)).

Referring to claims 7, Calvignac discloses the system discussed above. Furthermore Calvignac discloses that resources are considered in an order determined according to resource priority (the arbiter takes into account how much a resource is requests over time to make decisions (see figures 1,3 and 5)).

Referring to claims 8 and 11, Calvignac discloses the system discussed above. Calvignac does not disclose that when a resource is granted to a requester the requester removes requests for other resources so that multiple grants are not received during arbitration. However, it would have been obvious to one skilled in the art at the time of the invention to implement such features in Calvignac because doing so would make Calvignac operate more efficiently since one request

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has been granted and being used by the requester there is no need to keep the requests for the other resources since doing so would waste time and space of the system.

Referring to claim 9, Calvignac discloses the system discussed above. Furthermore Calvignac discloses that the requester priorities are recalculated after a resource is granted (the entire process is repeatedly performed (see claim 1)).

Referring to claim 10, Calvignac discloses the system discussed above. Furthermore Calvignac discloses that the distributed arbiter performing multiple iterations during one arbitration cycle to allocate resources to requesters (the process is repeated performed (see claim 1)). Note, the claim does not recite any limitations to how long the 'arbitration cycle' is, thus the entire life of the arbiter can be considered an 'arbitration cycle' and thus the arbiter repeatedly performs arbitration during this time.

Referring to claims 25 and 26, Calvignac discloses the system discussed above. Furthermore Calvignac discloses that the resources do not transmit grant indications to requesters (the resources are not involved in sending grant information to the requesters (see figures 5 and 6)), each requester determining grant values according to received information from other requesters (the arbiter receives information from other requesters and performs arbitration in order to grant access to one of the requesters (see figures 5 and 6));

the requesters and resources are synchronized in regards to round robin positions (a round robin arbitration is performed and thus they are synchronized for it (see figures 5 and 6)).

Referring to claims 27-31, Calvignac discloses the system discussed above. Furthermore, Calvignac discloses that each of the requesters provides an indication of priority on a bus logically combining the indications of priority, the priority being related to a number of requests being made by each of the requesters (the arbiter gives one of the input adapters priority to use the bus connecting the input adapter to the output adapter (see figure 1));

wherein the indications of priority are unary coded, one bit corresponding to one request (each request is represented by one bit (see figure 3));

wherein the bus logically combines the indications of priority (the switch operates all the busses at the same time according to the priority that is granted 9see figures 1-3));

wherein the indications of priority are a number of requests of respective requesters (the number of requests are used to determine priority (see figures 5 and 6 and column 6 lines 20-25)); and

further comprising a requester responding to the priority indication on the bus by not sending a request if the priority indication on the bus indicates a higher priority requester is requesting a resource (the requester who sends the least amount of requests is given priority and thus the other requesters are not grants the same resource as that requester (see figures 3-6 and column 6 lines 20-25)).

Referring to claims 32 and 34, Calvignac discloses the system discussed above. Furthermore, Calvignac discloses that the requesters are nodes of a network coupled to input ports of a network switch (the nodes of a network are inherently connected to the input adapter of the switch (see figure 1) and the resources are output ports of the network switch, multiple ones of the output ports being accessible to more than one of the input ports (the resources are output adapters of the switch, wherein the input and output adapters are all interconnected by a switch (se figure 1); and

further comprising recalculating requester priorities after each time a resource is granted to a requester (the arbiter arbitrates the resource allocation on an on-going basis (see claim 1, figure 1 and columns 3-7)).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 5, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Calvignac in view of Cooper et al. (USPN 4,648,029), hereafter referred to as Cooper.

Referring to claim 5, Calvignac discloses the system discussed above. Calvignac does not disclose that the one resource provides a grant indication to the one of the plurality of requesters. However, Cooper discloses a system wherein resource grant indications are send to the requester that gets access to the resource (see column 19 lines 35-60)). It would have been obvious to one skilled in the art at the time of the invention to implement this feature in the Calvignac system because doing so would make the system more reliable and efficient.

8. Claims 33, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Calvignac in view of Davis and further in view of Rehwald et al. (USPN 4,760,521), hereafter referred to as Rehwald.

Referring to claim 33, Calvignac discloses the system discussed above. Calvignac does not disclose that the requesters are processors and the resources are memories. However, Rehwald discloses a system wherein an arbiter is used to arbitrate the use of plural memories by plural processors (see figure 1 and abstract). It would have been obvious to one skilled in the art at the time of the invention to implement the arbiter of Calvignac, as taught in the system of

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Rehwald, because doing so would give the processing system of Calvignac the same benefits as the input/output adapter connection switching has, namely that of fair and efficient resource arbitration, thereby making Calvignac even more fair and efficient.

Allowable Subject Matter

9. Claims 12-15,17-24,35,37-49 and 51-50 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

Response to Arguments

10. Applicant's arguments with respect to claims 2-11 and 25-34 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments, see pages 13-19, filed 02/13/2004, with respect to claims 12-15,17-24,35,37-49 and 51-60 have been fully considered and are persuasive. The 35 USC 103(a) rejection of these claims have been withdrawn. However, these claims have now been newly rejected under 35 USC 112 second paragraph, as discussed above.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Odland, who can be reached at (703) 305-3231 on Monday – Friday during the hours of 8am to 5pm.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou, can be reached at (703) 305-4744. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist, who can be reached at (703) 305-4750.

deo

April 28, 2004



JOHN PEZZLO
PRIMARY EXAMINER